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Sent via email: wbr@usace.army.mil

Re: Draft Willamette Basin Review Integrated Feasibility Report and Environmental Assessment. Public Notice # CENWP-PN-E-1801

The Oregon Water Resources Department (Department), Oregon Department of Fish and Wildlife (ODFW), and the Oregon Department of Agriculture (ODA) appreciate the opportunity to comment on the draft Tentatively Selected Plan (TSP)/Integrated Feasibility Report. The Oregon Parks and Recreation Department and the Oregon Department of Environmental Quality also appreciate the opportunity to review and provide input; however, both agencies have no comments at this time. As you know, our agencies have been engaged on this planning study for several years and we appreciate the Corps efforts thus far and look forward to continued cooperation.

As the non-federal sponsor, the Department views this feasibility study as a unique opportunity to meet water supply needs in the Willamette River Basin—both instream and out-of-stream water needs. As Oregon's most populated basin, the Willamette Basin Project represents an already-available supply of stored water that can continue to support a very diverse and productive river basin.

The Department of Agriculture submitted comments in late 2016 and earlier this year. Some of those comments are summarized here. ODA also undertook an independent climate change assessment report, dated December 22, 2017, which was developed to supplement comments submitted by the agricultural community in May 2016. That assessment report has been submitted under a separate cover. Previous comments from our agency partners should be considered as the study moves forward. Our agencies prepared the following comments in good faith and to aid in the evaluation of the draft TSP.

The state looks forward to further information and analyses on the topics raised below, continued conversations and engagement with federal and state partners along with stakeholders on implementation, and a final plan that meets the needs of Oregon's water users as well as the recovery of ESA-listed fish.

If you have any questions, feel free to contact Alyssa Mucken at 503-986-0911 or alyssa.m.mucken@oregon.gov. Staff from the agencies referenced above are also available to help clarify any comments or provide additional information useful for the study.

Sincerely,

Doug Woodcock
Deputy Director

Impacts to Fish and Wildlife: The Willamette River Basin supports 31 native fish species and a great diversity of wildlife, and is a key tributary of the Columbia River. Three of these fish species, spring Chinook salmon, winter steelhead, and bull trout, are currently listed as Threatened under the Endangered Species Act (ESA). Flow management of the Willamette Valley Project has significant effects on all life stages of these species as well as their habitat. With these factors in mind, ODFW prepared comments to help evaluate the impacts of reallocating stored water on fish resources. The draft TSP analysis would benefit from providing a more complete and integrated picture of flows and their potential effects on fish and wildlife species.

- **Impacts downstream of Salem:** The TSP limits its analysis to flows to upstream of Salem. Flow needs for fish and wildlife also need to be evaluated below Salem to fully understand the impact of the draft TSP. It is estimated that 90 percent of the new municipal water and 50 percent of the agricultural water would be diverted downstream of Salem. Therefore, even when the flow target at Salem is hit, the reach between Salem and Wilsonville (about 45 river miles) could have significantly less flow under the draft TSP. In the summer, there is very little increase in natural flow over this reach, so the impact of increased withdrawals is heightened.
- **Benefits of Higher Flows:** The draft TSP does not look at the positive effects of flows above the Biological Opinion (BiOp) targets (which are minimum targets). Habitat and fish benefit from flows above the minimum targets; the binary analysis of whether the target was hit/not hit (e.g., Table ES-4 in the draft TSP) does not take this into account.
- **Environmental Flows in the Spring:** The draft TSP does not consider effects of high pulse flows which occur well above the BiOp targets. These ecological flows create and maintain important habitat types in the river and trigger behaviors that are essential to the life cycles of native fish. In addition, native fish, particularly the Oregon chub, are negatively affected by invasive species. High flows in the spring disrupt the life cycles of invasive species and thus benefit native fish. The potential effects of the draft TSP on the ability to provide high flows (above BiOp target) in the spring need to be addressed. The TSP would benefit from an evaluation of whether and how often the USACE will be able to provide these important environmental flows.

Modeling: More details are needed in the USACE modeling to fully evaluate impacts to fish and wildlife and their habitats.

- **Baseline of 2020:** The baseline of 2020 for hitting flow objectives appears to be arbitrary. ODFW believes it would instead be preferable to compare the draft TSP to the predicted frequency of hitting targets from the 2008 BiOp consultation.
- **BiOp Performance Estimates:** The percentage of time hitting BiOp target in the Res-Sim model may be overestimated. First, the draft TSP analysis assumes that all the joint use allocation can be made available for fish; however, it is likely that some of this water would be made available to other uses during certain periods. Second, ODFW would like to see an evaluation of how well the Res-Sim model performs against actual BiOp implementation data as a way to ground truth the model's performance.
- **Incorporate Exceedance Curves; Data downstream of Salem:** The percentage of time the flow target at Salem is hit is an incomplete measure of the fishery impacts. While percent of time hitting the target is one measure of performance, it is binary (hit/not hit) and additional scalable measures of performance would aid in the evaluation of the draft TSP. Monthly flow exceedance curves for the TSP vs. No Action should be reported; these would incorporate the magnitude and frequency by which targets are both missed and exceeded. These add useful information to the evaluation of TSP performance, and should specifically be analyzed for reaches both downstream and upstream of Salem.

Climate Change:

- **Impacts to Water and Related Resources:** The impacts of climate change on water resources, fish and wildlife, and agriculture, must be taken into account in order to fully evaluate the proposed storage and flow allocations. Climate change predictions show that snow will decrease and rain will increase in the basin (Brooks et al. 2017). This change from snow to rain may affect flood-control operations, and thus storage operations in the winter and spring. The decrease in snowpack will decrease summer low flows. Further, climate change is predicted to increase air temperature, which is positively correlated with increasing water temperature.
- **Climate Change & Fish and Wildlife:** While the draft TSP evaluates how climate change might impact needs of municipal and agricultural users (e.g., higher summer demand for municipalities - Appendix A, and expected increase in acre-feet/acre irrigation needed for agricultural users-Appendix B, Table 8-1) the draft TSP does not take climate change into account for fish and wildlife resources.
- **Temperature Impacts on Fish and Wildlife:** The impacts of anticipated temperature increases on fish and wildlife resources need to be fully evaluated in the draft TSP. These temperature effects are important because they show that additional flow above the BiOp target can significantly reduce downstream temperature. This is a critical evaluation as temperatures under present operating conditions are often near the threshold for key stages of Chinook and steelhead life cycles, meaning small changes in temperature can have major effects on the populations.
- **Increased Flows and Temperature Benefits:** The draft TSP should analyze the temperature benefits of flows above the minimum flow targets. To aid this analysis, USGS has developed draft regression equations relating water temperature at Salem to flow. For a given mean air temperature, these draft relationships indicate that an additional 1,000 cfs lowers the 7-day average maximum temperature at Salem around 1°C between June and August. In April and May, an additional 2,000 cfs lowers the temperature by 0.5 to 1.0°C. These calculations were made over the normal seasonal flow and temperature ranges.
- **Use of a Moderate Emissions Scenario & Agriculture:** Climate variability and change already have and are anticipated to significantly influence runoff hydrographs, with ensuing impacts to the amount of water that may potentially be stored and allocated in the basin. The draft TSP only involved an analysis using a moderate greenhouse gas emissions scenario with a constant rate of relatively low temperature change. The analysis also used historic precipitation conditions; no changes in precipitation type, timing or intensity. This is not likely commensurate with the gravity of potential consequences to water and related resources stemming from anticipated changes in temperature and precipitation conditions in the Willamette Basin. Thus, it is important that realistic climate change scenarios be utilized to plan for future impacts on agricultural activities. Analysis of existing operations using historic flow conditions and only future temperature conditions may lead to errors in demand estimates.

Fish Needs in the Future:

- **Use of Minimum/Current Targets:** The demand estimates for agriculture and municipal use incorporated future population growth and agricultural expansion in their potential allocation. However, the analysis for instream needs evaluated only the current BiOp flow targets, without consideration for future adjustments that will likely be needed to recover the listed species. The current flow targets are the minimum needed for recovery of fish species. Spring Chinook are still far below their recovery targets and this year's run of wild Steelhead was one of the lowest on record. Therefore, the current minimum targets may not account for full future water needs of ESA listed fish.
- **Changing Water Needs for Fish:** In addition, it is likely that water needs for fish may change in the future- e.g., reduced flow conditions or increased temperatures as a result of climate change, requiring additional long-term analysis beyond what is accounted for in the draft TSP.

Data Sources:

- **Irrigated Acreage:** The Census of Agriculture data are not comprehensive. To improve estimates of irrigated acreage in the Willamette Basin, the Project Team may want to consider contacting the USDA Farm Service Agency and Oregon State University Extension staff. That data, in combination with the Census of Agriculture data, can help fill data gaps and possibly create a more accurate depiction of irrigated acreage in the Willamette River Basin. The Department of Agriculture has seen an example in another county where irrigated acreage differed by approximately 20,000 acres between data sources.
- **Crop Coefficients:** Please remove reference to ODA as the source of crop coefficients in Appendix B, Section 3.1.3. The draft TSP inaccurately cites crop coefficients used in the agricultural irrigation demand estimates. ODA's preliminary coefficients that were referenced were under peer review, and have been substantially refined to provide for more detailed analyses or publication. ODA assembled preliminary data sets, including updated crop coefficients, and distributed data to relevant experts for peer review. Since the data were under peer review they were preliminary until all peer reviewer comments were received and incorporated and the model in which the data were to be used is fully calibrated. ODA explained the protocol to the Project Team, specifically, that the data and model output were based on preliminary data and not for use in more detailed analysis, publications, or released for review. The Project Team might consider using the finalized crop coefficient data sets from the Bureau of Reclamation's West-Wide Climate Risk Assessment project or those used in the Water Resources Department's 2015 Water Demand Forecast.
- **Weather Data for Penman-Montieth Irrigation Estimates:** Weather and climate are quite variable across the Willamette River Basin. It is unlikely that conditions at the Corvallis and Aurora AgriMet stations represent the full range of climate conditions throughout the basin. Using only two stations may produce errors in estimates of ET and associated irrigation demands. The Project Team may want to consider seeking additional data from other weather stations, if available, to better understand the climate variability across the basin.

Implementation:

- **Water Management during Drought Years:** The State recognizes there will be further discussion regarding implementation. However, additional detail is needed in order to fully evaluate the impact of the TSP on fish and wildlife and their habitats. The draft TSP only gives general information on dealing with deficit or drought conditions. A share-the-shortfall approach could make a low-flow condition worse in a bad year, and could result in serious losses in fish populations. Such losses often result in poor year-classes, which in turn can affect the population through many cycles, greatly hindering recovery. The draft TSP would benefit from further engagement and detail regarding how water will be managed in drought conditions.